

IMPROVING TEACHER QUALITY PROGRAM

Mathematics Within: Algebraic Processes and Its Connections to Geometry

PAGE 1 – PRE- PLANNING: TEACHER LESSON PLAN

Maria McGinnis and Elizabeth Sjulstad

Context of the lesson:

1. To help me understand the context of the lesson, please explain where this lesson occurs within a unit or series of lessons. Describe what led up to this lesson and what will follow.

This lesson occurs within the Unit 1 of *Everyday Math*. The sequence of the lessons is as follows, with A being the focus of this lesson:

- A. The students will explore the 100s chart using teacher directed rules describing 6 different patterns.
- B. The students will continue to explore the 100s chart by creating additional rules within a small group.
- C. The students will fill in their own 100s chart with a pattern of their choice.
- D. The students will play a game using the 100s chart and the rules created by the teacher and groups.
- E. The students will be given a 200s chart in order to expand the 100s chart and to compare patterns in both charts.
- F. The students will work on patterns in arrow arithmetic.
- G. The students will fill in missing numbers in a 100s chart.

2. What is the purpose of this lesson?

The purpose of this lesson is to review place value, to use a number grid as a tool to organize numbers, to see the orderliness of the number system, to see the properties of numbers (double digit numbers), and to explore patterns. Another purpose of this lesson is to investigate numbers as a cognitive function and not as a result of computation.

3. What do you anticipate taking place?

I anticipate that the students will discover 6 patterns from the teacher-directed rules in their groups. They will describe one of the six patterns in their Learning Logs, and they will prove that 3 numbers in a pattern fits one of the rules.

4. What strategies or techniques will you use to monitor learning?

I will monitor learning by observing the strategies the students and their groups are using and by monitoring their dialogue and Learning Logs.

5. How will you know if students have achieved the objective(s)?

I will know the objectives have been met when the students can locate patterns on the 100s chart and offer an explanation for these patterns in their Learning Logs.

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Participant(s) Name: Maira McGinnis; Elizabeth Sjulstad

Broad Topic: Numbers in Number System

Subtopic: Patterns; Orderliness; Place Value; Number Grids

Grade Level: 2 – 3

Time: 30 minutes

Aim: The overall aim/objective of this lesson is to explore number patterns within a Hundreds Chart (see p. 4)

Specific Objective(s):

- Student will discover six specific patterns from six teacher-directed rules in cooperative groups.
- Students will describe in words ONE of the three patterns in their Learning Logs.
- Students will prove for ONE pattern that three numbers in that pattern follow the rule in their Learning Logs.

Materials/Supplies:

- Hundreds Chart Sheets (**excel sheet labeled “100s chart” p. 4**)
- Direction Slips
- Crayons/Colored Pencils
- Playing Cards for division of groups
- Learning Logs

References: (text/handouts, etc)

- *Everyday Mathematics: Grade 3; Volume A; University of Chicago, 1998.*
- *A Collection of Math Lessons From Grades 3 Through 6, Marilyn Burns; Math Solutions Publications, 1987.*

Lesson:

• **Introduction**

In This activity, students will explore the Hundreds Chart for certain patterns dictated by 6 rules created by the teacher. To introduce the activity, teachers should:

1. Divide the class into groups. (Use a method that works for the setting and make-up of the class, etc.)
2. Put a transparency of a 100s Chart on the overhead.
3. Give the class a rule, such as “Color in all the numbers whose first digits are larger than their second digits,” and ask students for numbers that fit this rule.
4. As students respond, the teacher’s response will encourage students to offer explanations of their reasoning. Teacher will also record student responses in a list (either on the board or blank transparency).
5. After hearing a few student responses, teacher will direct groups to think of 2 more numbers that fit the rule. After sufficient time, groups will share their numbers.
6. Teacher will shade all numbers generated from this discussion on the Hundreds chart, facilitate a discussion with the whole group about the resulting pattern, encouraging students to use specific language when describing this pattern and record these descriptions on the overhead or on the board.

7. Teacher prompts students to prove that three of the numbers in the pattern meet the rule for the pattern. Teacher records these “proofs” on either the overhead or the board and includes statements about the proofs.

- **Body**

1. Teacher will explain the group task to the whole class.
 - Each group will be given an envelope with six direction slips and a paper with six 100s Charts (enough for each member in the group)
 - Students each take one of the chart sheets.
 - Students color in their own charts, but they are to work as a group on one direction slip at a time. Another direction slip cannot be started until all members are done with the previous one.
 - Students are expected to discuss their findings and strategies.
 - When finished, students will write a description of ONE of the patterns and prove for that ONE pattern, in a statement, that three numbers meet that rule.
2. Teacher will check for understanding/ask for questions about the task instructions.
3. Teacher will pass out the needed materials and students will begin the group task.
4. As the students are working, the teacher will circulate among groups to monitor their work.
5. While circulating/monitoring, teacher can:
 - Provide clarification of rules
 - Look for individual strategies
 - Note what language/vocabulary/terms may need to be addressed in the whole-class discussion
 - Observe/listen to dialogue among group members
 - When possible, teacher could pose open-ended questions about student strategies or reasoning to encourage students to think more deeply about their reasoning.
6. As groups finish, students will write a description of ONE of the patterns found, and prove that for ONE pattern in their statement three numbers meet that rule.

- **Close**

When all groups have completed the group task, students should be focused back to a whole group discussion about the results. Teacher can facilitate discussion in a couple of ways:

1. Teacher could read off a rule slip and students show which chart was the rule’s result. This may be very easy for students, but provides a quick warm-up and review.
2. Teacher has students describe the patterns of the charts and proofs of the pattern’s numbers as recorded in their Learning Logs. Like in the introduction activity, teacher should encourage students to use specific language in their explanations/descriptions and record their proofs in statements as well. (Probing questions by teacher will lead students to be specific).

- **Application/assessment**

Student learning will be measured by the quality of reasoning and thinking as displayed in Learning Log entries and teacher observation of groups.

100s CHARTS

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

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41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

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91	92	93	94	95	96	97	98	99	100

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81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Group:

Name:

Exploration of Patterns

1. Color in all the even numbers.
2. Color in all the numbers whose digits add to 8.
3. Color in all the numbers whose digits differ by 1.
4. Color in all of the numbers that have a 4 in them.
5. Color in all of the multiples of 3.
6. Color in all of the numbers with double digits.

Options: Possible extensions of this lesson plan

- Transfer 100s chart patterns onto number lines
- Choose a number that does not fit the rule and explain
- Move backwards on the 100s chart; see if the rule still works for skip counting.
- Use different numbers to skip count; check to see if the rule works backwards.
- Write your own 100s chart rules for a partner to fill in.
- Make a list of other times when you could use number patterns.